

**TO:** Director, National Institute for Occupational Safety and Health

**FROM:** California Fatality Assessment and Control Evaluation (FACE) Program

**SUBJECT:** Crane oiler dies when crushed between a crawler crane cab and track in California

**SUMMARY**  
**California FACE Report #97CA001**

A 38-year old male crane oiler (victim) died after being crushed between the underside of the cab (house) of a 250-ton crawler crane and its track. The crane was in operation removing falsework (lumber used in concrete forms) from a wharf under construction. Prior to his movement, the oiler did not inform anyone that he was going to go under the crane. It is normal company procedure to notify the crane operator when entering a dangerous area around the crane. It was uncertain why he walked under the crane. When the crane operator swung the cab around after picking up some slings, the victim was dragged across the track of the crane by the cables and structural members on the underside of the crane cab. He was observed to drop on to the ground on the outside of the track. The CA/FACE investigator concluded that, in order to prevent future occurrences, employers should:

- . assure all personnel communicate their intentions to the crane operator when proceeding to an area of danger.
  - . use a constant audio communications system to facilitate conversation, especially in noisy areas.
  - . Isolate or barricade the danger zone created by the rotating cab of the crane
- Additionally, crane manufacturers should:
- . install sensors or active/intercessory warning devices in danger zones of the crane which must be entered by employees

**INTRODUCTION**

On January 7, 1997 at 10:30 a.m., a 38-year old crane oiler was crushed between the track of a crawler crane and the structural members on the underside of the crane's cab. The victim was declared dead at 11:03 a.m. The CA/FACE investigator learned of this incident from the legal office of the Division of Occupational Safety and Health (Cal/OSHA) on January 10, 1997. The CA/FACE investigator traveled to the site of the incident on January 13, 1997. He met with the project manager of the construction site and the victim's supervisor. The CA/FACE investigator took photographs of the crane involved in the incident. The CA/FACE investigator obtained copies of the Cal/OSHA form 36, the coroner's report and the death certificate. The employer had been in business for 88 years and had a total of 275 employees, with 42 working at

the site at the time of the incident. The victim had worked for this marine construction and engineering company for 7 1/2 years. The victim had worked on this job site for 9 months, 6 months of which were as the oiler for the crane operator involved in this incident. The victim had begun his apprenticeship program with this company in 1988 and had extensive training and experience for his job. The crane operator had been running this crane since February 9, 1997 and was considered by his management to be a skilled operator.

Safety was the responsibility of the project manager who, in turn, delegated it to the supervisors and foremen working for him. Safety meetings were held by the supervisor or foreman on Monday mornings for each of their respective groups. The employer had a complete safety program and each employee had a copy of the company's safety rule book. Site surveys were conducted on an as needed basis, especially with respect to the crane involved in this incident. Because of its size and the soft soil, the site of the crane placement had to be checked on a frequent basis.

## INVESTIGATION

The site of the incident is a major ocean harbor. The employer was hired to construct a concrete wharf. Prior to the incident, the company had dredged the area where the wharf was to be constructed. They had also built a rock dike. The company had driven 2,600 piles upon which the wharf would be constructed. Falsework had been placed and all the major concrete work had been completed. Prior to the incident, it had been noted that the crane was making some noise. The crane involved in the incident was company-owned and it was well maintained. The crane was taken out of service for one week to service the boom hoist area. The night before the incident, the crane was tested to assure that it was fit to be placed back into service.

On the day of the incident, the decedent, as normal, arrived prior to other employees to grease and prepare the crane for service. The crane involved in this incident was a 250-ton crawler crane with a 220-foot boom (including the jib) (see **Exhibit 1**). The area where the crane was operating had been leveled two hours before the incident to ensure a stable operating platform (see **Exhibit 2**). The job at the time of the incident was to remove wooden falsework used in forms for the concrete which was poured for the wharf under construction. When the last of the lumber had been removed from the water, the rigger was instructed to remove the 1/2-inch chokers (slings) from the hook of the crane. The next phase of the operation was to place 7/8-inch chokers on the hook to begin to pull out some large beams.

The operator swung the boom to the west where the 7/8-inch chokers were located. They were placed on the hook. During this time, the decedent entered an area underneath the cab (house) of the crane in the counterweight area (see **Exhibit 3**). It is normal procedure for the oiler to check the crane when he hears noises or when mechanical problems are suspected. It is unknown why the decedent entered the area underneath the crane. It is possible to observe the brakes and rollers from that area. However, it is standard operating procedure of the company to communicate with the operator of the crane when proceeding into an area of danger. According to witnesses and company management, the decedent did not inform the crane operator, co-workers or managers that he was going to access the area underneath the cab of the crane.

The crane operator began to swing the boom of the crane to the east so the 7/8-inch chokers could be used to pull out the beams. When he did, the decedent became trapped between the cables and structural members of the frame of the cab and the track on the west side

of the crane (see Exhibits 4 and 5). The space between the underside of the cab and the track appeared to be no more than eight inches (see Exhibit 6). As the crane boom swung to the east, the rear of the cab swung west and dragged the decedent between the track on the west side of the crane and the underside of the cab. The decedent was dropped on the outside of the track. A welder working on the job yelled at the crane operator to dog off (stop operation) and call for help.

The supervisor, who had been working on the wharf came to the incident area and immediately called the construction site office on his two-way radio to request 911 assistance. The crane operator and the supervisor administered two-person CPR. The supervisor stated that he believed that the actions of CPR obtained a pulse. CPR was stopped when the paramedics, who were dispatched at 10:31 a.m., arrived at 10:33 a.m. to begin their assessment and course of treatment. The paramedics found the decedent to have agonal respirations and no pulse or blood pressure. The decedent was transported to a local hospital. There was no response to the life saving efforts of hospital personnel and death was pronounced at 11:03 a.m.

## **CAUSE OF DEATH**

The coroner's report states the cause of death to be blunt injuries.

## **RECOMMENDATIONS/DISCUSSION**

**Recommendation #1: Employers should assure all personnel communicate their intentions to the crane operator when proceeding to an area of danger.**

Discussion: A construction crane is an inherently dangerous piece of equipment to work around. Many safety problems can and do occur. Communication, whether direct or by hand signals are a must to apprise the crane operator of all ongoing conditions. This includes the location of all employees who may be in or entering an area of danger. Although it was standard operating procedure for the oiler to communicate with the crane operator when he or any other person enters or plans to enter an area of danger, the decedent did not convey his intentions to enter the area beneath the crane while it was in operation. When the crane operator swung the cab around the decedent was trapped and crushed between the underside of the cab and the track of the crane. If the crane operator had been aware of the decedent's position, he would not have moved the cab of the crane and this incident most likely would not have happened.

**Recommendation #2: Employers should use a constant audio communications system to facilitate conversation, especially in noisy areas.**

Discussion: There was a breakdown in communications between the oiler and the crane operator. An audio communications system could provide not only a faster but a clearer means of communicating. The area around a large crane is inherently noisy when the crane is in operation and therefore difficult for the crane operator and others in the area to hear verbal instructions. A constant audio communications system could keep all employees involved in the work in and around the crane informed. If the decedent had heard, via the communications system, instructions for the crane operator to swing the boom, he may have been able to remove himself from the area of danger. Likewise, if the crane operator had heard the decedent indicating his location, he would most likely not have swung the boom.

**Recommendation #3: Employers should isolate or barricade the danger zone created by the rotating cab of the crane.**

Discussion: The area around the crane in this incident was open and could be entered by anyone on the site if not prevented from entry by site personnel. The decedent was authorized to enter the danger area around the crane created by the rotating cab. Prior to entering this area, the decedent was required to notify the crane operator. In this incident he failed to make such notification. To assume that perfect human performance can be achieved to avoid injury or death is unrealistic. If a barrier had to be crossed in order to enter a danger zone, not only would it most likely keep out unauthorized persons, it also would act as a reminder for those authorized to cross to notify the crane operator. Such notification should prevent the rotation of the cab by the operator and thereby prevent fatalities such as this one.

**Recommendation #4: Manufacturers should install sensors or active/intercessory warning devices in danger zones of the crane which must be entered by employees.**

Discussion: In this incident the crane operator would not be aware of a person entering the danger zone of the crane created by the rotation of the cab unless he actually observed the person entering or he was notified of such entry. The cab of the crane involved in this incident was located where the operator would rarely notice anyone entering the danger zone. If he was not notified that someone was in the danger zone, he could swing the cab and potentially injure that person. In all known cases where someone entered the danger zone and was caught in a pinch point of the crane, the danger zone was outside the crane operator's vision. Survivors of these occurrences have consistently stated they had good cause to believe the crane operator was not going to rotate or slue the boom at that particular moment. The design of many cranes has not taken into consideration the need for oilers or other maintenance personnel to have safe entry and exit into and from their particular work areas of the crane. In some cases, safe designs cannot be engineered and built. In these cases, such as this incident, manufacturers should install active/intercessory warning devices that detect entry into the danger zone resulting in immediate notification of the crane operator. Examples of such notification are alarms, horns or flashing lights. Had the crane operator been alerted by a warning device, he most likely would not have rotated the cab.

**References**

Barclays Official California Code of Regulations, Vol. 9, Title 8, Industrial Relations, South San Francisco, 1990

Dickie, D.E., Crane Handbook, First Edition, Construction Safety Association of Ontario publications, 1978

MacCollum, David V., Crane Hazards and Their Prevention, First Edition, ASSE publications, 1993

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**FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM**

The California Department of Health Services, in cooperation with the California Public Health Foundation, and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations on work-related fatalities. The goal of this program, known as the California Fatality Assessment and Control Evaluation (CA/FACE), is to prevent fatal work injuries in the future. CA/FACE aims to achieve this goal by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

NIOSH funded state-based FACE programs include: Alaska, California, Colorado, Georgia, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Wisconsin, and Wyoming.

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**Additional information regarding the CA/FACE program is available from:**

**California FACE Program  
California Department of Health Services  
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Richmond, CA 94804**